

My name is Elazer Edelman and I represent scores of Morris' students – he adored us and we him. I will try to represent our cumulative perspective of this remarkable man, but the inadequacies of my skill and fluency, and limitations of our time today precludes completeness – so please forgive me.

Morris' Hebrew name is *Moshe Yehuda* – *Moshe* the biblical Moses and Judah the lion amongst the sons of Jacob. In every respect Morris embraced these two names of the two most powerful men in the bible, the two men of highest attainable leadership, Moses the paradigmatic loving, doting teacher-leader, Judah the prince of greatest strength and highest moral rectitude.

Morris, like the Biblical Moses was a prince in an oppressed land. Moses the prince was deeply affected by the savage cruelty of Egyptian slavery, Morris the privileged prince in South Africa deeply affected by the oppression in his country. Apartheid inculcated within the fibers of Morris' being a never ending hate for slavery and injustice and an abiding love for all. He forever saw prejudice as a pathology of the soul akin to disease processes that affect men's bodies. And throughout his life he worked to provide cures for illness of the body and soul through equal access of all to science, health and education. For all that he did in life, Morris was most proud that he had delivered more than a hundred babies, worked in clinics in rural Zululand and as a general practitioner in an African township. This he not only told us but wrote– what he did not relate to many was that he continued this passion for his entire life. When he came to HMS he, Cliff Barger and Morris' brother Manfred (and you cannot talk about Morris without talking about Manfred) not only advocated for a diverse and representative student body but as department chairs and leaders held special weekly seminars for students from underrepresented schools. Now that Cliff, Manfred and Morris are gone none will know unless we hold their mission dear.

Like Moses who grew up in the palaces of Egypt and was exposed to the best of culture, Morris was the most cultured man we've met. His mother, he told us with pride was an opera singer, and his parents' home was a magnet for famous visitors to South Africa from all walks of life. He related how he sat on the lap of Rachmaninoff and learned to play piano from the greats. Later, he insisted that the laboratory watch the transmission from Russia of Vladimir Horowitz's piano recital after a lengthy exile and then remarked with great insight as to the unique unbent positioning of Horowitz's fingers as he played. Explaining that this posture created a key strike that produced the most colorful, pure and consistent tones.

The biblical Moses knew it all and was dedicated to conveying Mosaic law to all who would listen, he is in fact known to this day as *Moshe Rabbenu*, Moses our Teacher. So it is with our teacher Morris. There is nothing he did not know, no book anyone read that he could not quote from, no poem he could not cite, no scientific article he could not critique and he could be critical but never in a mean of nasty way. But he was also like the biblical Judah as well saving the

greatest scrutiny for his own science and holding the highest expectations of himself. He would not release a paper until he was sure of the science and proud of the prose. So when he did publish he could be firm in his beliefs. And he was patient – allowing others the time he took to realize his insight. He wrote in his autobiography that “One thing I have learned over the years is that sometimes it takes a long time for the significance of one’s results and hypotheses to be fully recognized. “ Confident but never aggressively assertive - he was not afraid nor threatened by admission of error. He could readily declare like the Biblical *Yehuda, Tazadka memeni* (referring to Tamar *She is more righteous than I*) – in Morris’ words “Occasionally, of course, we were plain wrong”.

Morris above all was a towering intellect of prodigious productivity – he is the most quoted author in pathology, the sixth most widely quoted author in all of medicine, the author of six citation classics; six of his papers have been cited more than 1,000 times (no one has six citation classics) and his HRP reaction paper has been referenced almost 8000 times. He was the person who defined gap junctions, the endothelial nature of the blood-brain barrier, the true nature of vascular permeability, the essence of glomerular permeability and the slit diagram, the biochemistry of the reactive oxygen species, immunoglobulin and lymphocyte biology, how lipid domains arise and the phenotypic dynamism of the endothelial cell.

Morris understood full well the impact of his work and like everyone he liked the acclaim but this was never utmost on his mind –it mattered to him but it was not preeminent. It would be too simple to say that he was modest, and it was not the case that he was not unaware, he was amused not bothered when such acclaim did not arrive and he never ran after fame. He often laughed that the paper that defined how an endothelial product (heparin) modulated subjacent vascular smooth muscle cells that he co-authored with Alec Clowes was scrutinized for veracity but neither author cared to notice that both of their names were misspelled. He spoke lovingly of his time as escort for Lord Florey during the Dunham lectures, in his capacity as the most junior faculty member in the Department of Pathology. He also let slip that Florey told Morris that he was enamored with Morris’ work. Like a good son and student, I rolled my eyes in disbelief only to my horror years later realize that Morris had in fact understated matters. When I finally found Florey’s paper in the British Medical Journal I had to then call Morris to ask forgiveness – one entire column of this paper, termed the Endothelial Cell, is labeled *Karnovsky’s Work* and Florey indeed wrote that he was enamored.

Morris did not seek fame and did not care for things – he refused to patent ideas that he felt should be in the public domain; material gain was immaterial to him. He cited von Roentgen and Einthoven who both felt that the products of scientific investigation belong to the community – imagine he said what would have happened to access to x-Rays and the EKG had roentgenography and electrocardiography been patented. The horseradish peroxidase (HRP)-

diaminobenzidine (DAB), and the modified Ito-Karnovsky fixative, e.g. which enabled immunohistology, are worth billions. Morris felt they belonged to the public – he did not patent them and went to great lengths to ensure unfettered access to these processes. His paper on fixatives was never written for he gave away the recipe and the original abstract so that literally hundreds of papers had been written before he could write the paper.

Morris did not care for titles, He was president of the American Society of Cell Biology, and Co-President of the American Association of Pathologists. He has served on the editorial boards of *The Journal of Cell Biology*, and *The American Journal of Pathology*, among others. Twice interim department chair he never used the title – he just did the work.

He had drawers full of awards the Benditt, the Rous-Whipple, and E.B. Wilson Awards, the Gold-Headed Cane. He was the Maude Abbott Lecturer of the US and Canadian Academy of Pathology, member of the National Academy of Medicine, American Academy of Arts and Sciences, Royal Microscopical Society, and on – but all of these accolades remained in his drawer.

Time and again I have seen him quietly and unassumingly insist that others be given recognition that might rightfully be his alone. When asked to speak at international fora he promoted his students in his stead. He insisted that funds provided be assigned solely to me rather than to his own research account, and on one incredibly poignant instance I was in his office when he was notified that he was chosen for an international award with a substantial monetary prize. I was astounded when he turned it down and heard him say, “I am honored, but I know that so-and-so has been nominated for this award through the years. He is quite sick, please give the prize to him for it will mean so much to him, there will always be other years for me.” You can all envision Morris saying this and imagine the impact that hearing this interaction would have on a student.

So what did he love – his family (oh how he loved you all) and his students. He adored his students and they in turn adored him. He was passionate about teaching. He taught continuously in basic pathology for more than 50 years, he started the Macy graduate program, but it was his LAB that he loved most. As his post-doctoral fellows we would plan our days so that we could eat lunch, or walk the quadrangle with him discussing science and education, the changing societal mores and governmental support for research, and vexing policy decisions he was faced with, but also how Olmstead’s plans for the trees in the quadrangle differed from that of the other great parks, and how horrible the new underground parking garage turned out. He introduced us to great art and literature from many cultures, and in doing so showed us how to appreciate diversity of thought and respect for all opinions. He carefully selected and mounted a valuable and beloved personal piece of art in each post-doc’s office. These were his favorites, and we would joke that they were on loan from the “*Morris and Shirley Karnovsky Collection*” for display

in the museum that was his laboratory. When I finally left to direct my own laboratory Morris gave me the piece that he had hung in my office for so long. It is an abstract work of the greatest beauty and muted intensity, and it is one of my wife's and my most prized possession. I cannot imagine parting with it, and knowing how proud Morris was of it I do not know how he did. I suspect that Morris clearly knew exactly what he was doing when he gave it to me, for this piece serves in its own way as a moral lighthouse, a constant reminder of who I am, where I can from, and what I must strive to be.

The Bible ends with description of the death of Moses, carefully recording that though 120 years old, "his eyes were not weak nor his strength gone" Despite his age, Moses was still in his prime when he was called home. Morris J., *Moshe Yehuda*, Karnovsky was the most brilliant, the most impactful, the most modest the most larger than life, the most gifted, the most cited, the most well read, the most awarded – the most most. (לא-כהתה עינו ולא-נס לחה) *His eyes did not dim, nor his natural force abate*, he was insightful and attentive, loving and vibrant to the end, and to the end interested most in us and our children and our science and then he was gone.

I end as he did his biography – quoting Joachim du Bellay, 1559, Les Regrets

*Heureux qui comme Ulysse, a fait un beau voyage.*

*Happy he who like Ulysses has made a glorious voyage.*

Bon voyage my teacher prince.